



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20230
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/889,860	07/23/2001	Jean-Michel Georges	BDL-341XX	1184

207 7590 03/13/2003

WEINGARTEN, SCHURGIN, GAGNEBIN & LEOVICI LLP
TEN POST OFFICE SQUARE
BOSTON, MA 02109

EXAMINER

AFTERGUT, JEFF H

ART UNIT

PAPER NUMBER

1733

DATE MAILED: 03/13/2003

21

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/889,860

Applicant(s)

GEORGES ET AL.

Examiner

Jeff H. Aftergut

Art Unit

1733

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) : 6) ☐ Other

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-10, 12, 18, 19, 21, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by E.P. 913,504.

E.P. '504 suggested that it was known at the time the invention was made to form a bowl for a crucible by filament winding on a mandrel a yarn which has been impregnated with a carbon precursor followed by densification of the filament wound product. The reference suggested that those skilled in the art would have formed two such assemblies simultaneously by winding upon a hollow mandrel and severing the same in the middle whereby two such bowl shaped components would have been formed followed by the densification of the assembly. The reference suggested in such an arrangement as described with reference to Figure 7 that one skilled in the art would have formed a crucible which included a hole therein in the bottom which would have been plugged as described with reference to Figure 8. The applicant is more specifically referred to Figures 3, 7 and 8 and the associated description of the same. See also column 4, lines 2-10, column 6, lines 6-35, column 7, line 36-column 8, line 55, and examples 1 and 2 where the reference suggested that phenol resin would have been used as the precursor resin material.

With regard to claim 2, the reference to E.P. '504 suggested that those skilled in the art would have formed the perform prior to application of chemical vapor deposition (column 6,

lines 28-35. regarding claims 3-5, the reference to E.P. '504 suggested that those skilled in the art would have applied filament winding techniques to manufacture the crucible wherein the filaments were carbon filaments which were impregnated with phenol resin. Regarding claim 6, the reference suggested the formation of two bowls simultaneously in a winding operation, see Figure 7 and the associated description of the same. regarding claims 7 and 8, the reference to E.P. '504 suggested that carbon fiber would have been used as the fiber material which was wound and there is no indication that the carbon fiber had any pretreatment applied thereto in order to provide surface functions. Regarding claims 9 and 10, applicant is referred to column 6, lines 28-35. regarding claim 12, the reference suggested that one skilled in the art would have densified the crucible to form carbon matrix therein, see column 6, lines 6-27. regarding claims 18, 19, 21, and 22, the chemical vapor impregnation step in E.P. '504 was stated to provide a pyrolytic carbon coating over the entire structure (column 6, lines 28-35).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-12, 18, 19, 21, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over E.P. 913,504 in view of Japanese Patent 11-255586.

The reference to E.P. '504 is discussed in full detail above and applicant is referred to the same for a complete discussion of the reference. The reference taught that the graphitization temperature was 2000 degrees C, and not 2200 degrees C or greater. However, in the art of

Art Unit: 1733

manufacturing a crucible which was filament wound and provided with a carbon matrix via graphitization, it was known to graphitize the material at a temperature between 1500-2500 degrees C as evidenced by Japanese Patent '586 (see paragraph [0028] and the machine translation of the same). clearly heating above 2200 degrees C was known per se in the art of graphitizing when forming a carbon carbon composite which was formed by filament winding and carbonizing to manufacture a bowl. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the techniques of Japanese Patent 11-255586 to graphitize the carbon precursor material of E.P. 913,503 wherein the processing would have been known to generally take place at temperatures of between 1500-2500 degrees C.

Regarding claim 23, it is taken as conventional in the art at the time the invention was made to employ a single furnace and/or chemical vapor deposition device for application of coatings and/or carbonization of multiple components. The use of single device to graphitize and/or apply coatings via CVD would have been obvious to the ordinary artisan in the operation set forth above in particular because the reference suggested the formation of two crucibles at the same time (see EP '504 where two crucibles were simultaneously wound). To utilize conventional and well known processing to form multiple articles simultaneously would have been within the purview of the ordinary artisan.

5. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over E.P. 913,504 further taken with Soviet Union Patent 1699755 (abstract and clipped figure only).

E.P. '504 is discussed above in full detail and applicant is referred to the same for a complete discussion of the reference. The reference failed to teach that those skilled in the art would have formed the plug for the crucible from two pieces of material which was a graphite

Art Unit: 1733

material (or carbon composite material) which was assembled together. However, in the art of manufacturing a crucible, it was known to plug holes formed within the crucible with a two piece plug which was attached to the sides walls and fitted into the holes with an adhesive material which was capable of undergoing carbonization as taught by Soviet Patent abstract '755, see the Figure as well as the abstract of the disclosure noting that the adhesive employed was a carbon precursor material. While the reference did not express that one skilled in the art would have subjected the finished assembly to carbonization, graphitization as well as chemical vapor deposition, one viewing the reference to E.P. '504 would have understood that such processing was desired for finishing the crucible perform. Note that in E.P. '504 the carbonizing operations and chemical vapor infiltration operations were preformed upon the performs which both had no plugs therein as well as those which contained plugs and to perform the operations to provide a final coating of pyrolytic carbon coating about the exterior and interior of the same would have been within the purview of the ordinary artisan. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ a two part plug for plugging a hole in a crucible formed from graphite materials as such was known per se as evidenced by Soviet Union Patent abstract 1699755 in the process of making a crucible as taught by E.P. 913,504. it should be noted that the reference to E.P. '504 suggested that those skilled in the art at the time the invention was made would have known to interfit the plug into the opening wherein the plugging element was forced into the opening and was tapered and the reference additionally suggested screw threads for pressing the plugs into the crucible.

6. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 5 further taken with any one of Holcombe et al, Kondo et al, or Metter et al.

While the references as set forth above in paragraph 5 suggested that those skilled in the art at the time the invention was made would have applied a pyrolytic carbon onto the exterior of the finished crucible, the references do not suggest that one skilled in the art at the time the invention was made would have incorporated a silicon carbide as the exterior coating. However, those familiar with the formation of crucibles for containing liquid metals would have found it obvious at the time the invention was made to employ a silicon carbide coating on the exterior of the crucible instead of a pyrolytic carbon coating as suggested by any one of Holcombe et al, Kondo et al, or Metter et al. each one of Holcombe et al (column 9, lines 16-45), Kondo et al (column 2, lines 5-12), or Metter et al (column 8, lines 40-56) all suggested that those skilled in the art at the time the invention was made would have incorporated a silicon carbide coating upon the crucible as an alternative material to pyrolytic carbon coatings. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a silicon carbide coating instead of a pyrolytic carbon coating upon the exterior of the carbon-carbon composite crucible as such was a well known alternative coating material as suggested by any one of Holcombe et al, Kondo et al, or Metter et al in the process of manufacturing a crucible as set forth above in paragraph 5.

7. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over E.P. 913,504 in view of any one of Holcombe et al, Kondo et al, or Metter et al.

The reference to E.P. '504 suggested that those skilled in the art at the time the invention was made would have applied a pyrolytic coating about the exterior of the finished assembly via chemical vapor deposition. The reference failed to expressly state that one skilled in the art would have applied a silicon carbide coating about the exterior. However, those familiar with the formation of crucibles for containing liquid metals would have found it obvious at the time the invention was made to employ a silicon carbide coating on the exterior of the crucible instead of a pyrolytic carbon coating as suggested by any one of Holcombe et al, Kondo et al, or Metter et al. each one of Holcombe et al (column 9, lines 16-45), Kondo et al (column 2, lines 5-12), or Metter et al (column 8, lines 40-56) all suggested that those skilled in the art at the time the invention was made would have incorporated a silicon carbide coating upon the crucible as an alternative material to pyrolytic carbon coatings. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a silicon carbide coating instead of a pyrolytic carbon coating upon the exterior of the carbon-carbon composite crucible as such was a well known alternative coating material as suggested by any one of Holcombe et al, Kondo et al, or Metter et al in the process of manufacturing a crucible as set forth above by E.P. 913,504.

8. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 6 further taken with Japanese Patent 11-255586.

The references as set forth above in paragraph 6 suggested all of the features of the claim invention, however there was no recognition that one skilled in the art would have finished the assembly in a furnace at a temperature 2200 degrees C or above. The reference to E.P. '504 taught that the graphitization temperature was 2000 degrees C, and not 2200 degrees C or greater. However, in the art of manufacturing a crucible which was filament wound and provided

with a carbon matrix via graphitization, it was known to graphitize the material at a temperature between 1500-2500 degrees C as evidenced by Japanese Patent '586 (see paragraph [0028] and the machine translation of the same). clearly heating above 2200 degrees C was known per se in the art of graphitizing when forming a carbon carbon composite which was formed by filament winding and carbonizing to manufacture a bowl. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the techniques of Japanese Patent 11-255586 to graphitize the carbon precursor material of the references as set forth above in paragraph 6 wherein the processing would have been known to generally take place at temperatures of between 1500-2500 degrees C.

Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 17, line 2, the word "phaseis" appears which should be changed to --phase is--.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff H. Aftergut whose telephone number is 703-308-2069. The examiner can normally be reached on Monday-Friday 6:30-3:00pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael W. Ball can be reached on 703-308-2058. The fax phone numbers for the

Application/Control Number: 09/889,860
Art Unit: 1733

Page 9

organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.


Jeff H. Aftergut
Primary Examiner
Art Unit 1733

JHA
March 6, 2003